



## Humidity and Temperature Guidelines

Maintaining proper relative humidity and temperature before, during and after installation is essential to assuring longevity, quality, and performance of maple floors and flooring systems.

### **Temperature, Relative Humidity and Wood Moisture Content**

For optimal function and performance, indoor relative humidity (IRH) level should be maintained within a 15% range, e.g., between 25-40%, 35-50%, 50-65%, etc., at a temperature between 55 °F and 75 °F. Importantly, the midpoint of the 15% relative humidity range must correlate with the midpoint of the anticipated seasonal wood moisture content and related RH levels based on a project's geographic location.

Refer to the [USDA Forest Products Laboratory Wood Moisture Map of North America](#) to determine the expected seasonal wood moisture range at a project's location. The expected seasonal wood moisture indicated on the map can be translated into the expected relative humidity (RH) using the [USDA Forest Products Laboratory Wood Moisture Content table](#). An excerpt of the table is below.

WOOD MOISTURE (WMC)/ RELATIVE HUMIDITY (RH)												
Temperature 55-75 ° F							Data Source: USDA Forest Products Laboratory					
Avg. WMC	3.6	4.6	5.4	6.2	7.0	7.8	8.6	9.3	10.2	11.1	12.1	13.3
RH	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%

*Note, WMC represents an average since temperatures between 55-75 °F have minimal effect on WMC.*

### **Seasonal Range**

Limiting wide swings in RH by targeting a 15% RH range in atmospheric conditions within a facility reduces flooring expansion and contraction related to seasonal atmospheric changes, i.e., periods of high humidity and low humidity. Excessive shrinkage and/or expansion may occur when the IRH exceeds a 15% variance.

### **Regional Influence**

Climate conditions in various regions of the United States will influence a facility's humidity range. For example, installations in dry regions in the Southwest desert areas may result in an RH range of 25-40%, Midwest regions may result in RH levels of 35%-50% range, whereas humid coastal areas may experience an RH range of 50-65%. When broader ranges of RH exist, it is important to consider the midpoint of the actual prevailing RH range and the midpoint of the optimal 15% range. Centering of the midpoints will assist in minimizing the effects of excessively high and low periods of RH.

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### **Available Mechanicals**

HVAC systems need to be designed to control the inside conditions within the 15% RH range and accommodate proper air circulation for best results. HVAC system design and operation also need to consider the effect of air exchange supply and timing on the in-room temperature and relative humidity. Example, running the system with dampers wide open during inclement weather will impact inside relative humidity.

COVID-19 prompted updates to air exchange policies. Increased ventilation rates can help dilute airborne contaminants and improve indoor air quality, which is beneficial for occupants. However, higher ventilation rates can also lead to drier indoor air. This is especially true during winter when low temperature outdoor air is brought inside and heated to room temperature, producing a significant drop in indoor relative humidity. This process results in excessive shrinking/gapping of the maple flooring boards.

In buildings where air conditioning is not available, circulating and venting fans should be used, if possible, to benefit the targeted humidity range. Opening vents and available corridor doors can also be an option to improve air circulation. Facilities without adequate HVAC equipment to regulate indoor atmosphere, or those facilities that are “closed up” with no ventilation for extended periods of time (i.e., summer breaks) are more likely to develop flooring problems related to the environment.

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**See also:** [Cupping Crowning, Compression Ridging, & Compression Set](#), [Expansion Spacing \(Washer Rows\)](#), [Humidity and Environmental Recommendations](#), [Shrinkage Cracks](#), [Site Evaluation](#), [USDA FPL Wood Moisture Content Table](#), and [USDA FPL Wood Moisture Map of North America](#)